Amendments to the Specification

Page 6, beginning at line 23, to page 8, line 16, delete the entire four paragraphs.

Page 6, beginning at line 23, to page 8, line 16, add the following four paragraphs:

Fig. 6 is a side cross-sectional elevation view of a merged magnetic head 40, which includes a write head portion 70 and a read head portion 72, the read head portion employing a spin valve sensor 74 of the present invention. Fig. 7 is an ABS view of Fig. 6. The spin valve sensor 74 is sandwiched between nonmagnetic electrically nonconductive first and second read gap layers 76 and 78 which are, in turn, sandwiched between ferromagnetic first and second shield layers (S1) and (S2) 80 and 82. In response to external magnetic fields, the resistance of the spin valve sensor 74 changes. When the sense current I_S is conducted through the sensor the resistance changes cause potential changes which are processed as readback signals by the processing circuitry 50 shown in Fig. 3.

The write head portion 70 of the magnetic head 40 includes a coil layer 84 which is sandwiched between first and second insulation layers 86 and 88. A third insulation layer 90 may be employed for planarizing the head to eliminate ripples in the second insulation layer caused by the coil layer 84. The first, second and third insulation layers are referred to in the art as an "insulation stack". The coil layer 84 and the first, second and third insulation layers 86, 88 and 90 are sandwiched between first and second pole piece layers (P1) and (P2) 92 and 94. The first and second pole piece layers 92 and 94 are magnetically coupled at a back gap 96 and have first and second pole tips 98 and 100 which are separated by a write gap layer 102 at the ABS. Since the second shield layer (S2) 82 and the first pole piece layer (P1) 92 are a common layer (S2/P1) this head is known as a merged head. In a piggyback head (not shown) the layers 82 and 92 are separate layers and are separated by an insulation layer. As shown in Figs. 2 and 4, first and second solder connections 104 and 106 connect leads from the spin valve sensor 74 to leads 112 and 114 on the suspension 44, and third and fourth solder connections 116 and 118 connect leads 120 and 122 from the coil 84 (see Fig. 8) to leads 124 and 126 on the suspension.

Fig. 9 is an enlarged ABS illustration of the read head 72 shown in Fig. 6 wherein the read head 72 includes the spin valve (SV) sensor 74. First and second hard bias and lead layers 134 and 136 are typically connected to first and second side surfaces 138 and 139 of the sensor 74. This connection, which conducts the sense current (I_S) through the sensor, is known in the art as a contiguous junction as referred to hereinabove. The first hard bias and lead layers 134 include a first hard bias (HB1) layer 140 and a first lead layer (Lead 1) 142. The second hard bias and lead layers 136 include a second hard bias layer (HB2) 144 and a second lead layer (Lead 2) 146. The hard bias layers 140 and 144 produce a longitudinal bias field to stabilize the free layer of the sensor 74 in a single magnetic domain state. The sensor 74 and the first and second hard bias and lead layers 134 and 136 are located between the nonmagnetic electrically insulating first and second read gap layers (G1) and (G2) 76 and 78. The first and second read gap layers 76 and 78 are, in turn, located between the first and second ferromagnetic shield layers (S1) and (S2) 80 and 82.

The Invention

The present spin valve sensor 200 is illustrated in Fig. 10 wherein the spin valve sensor is located between the first and second read gap layers (G1) and (G2) 76 and 78 and the first and second read gap layers are located between the first and second shield layers (S1) and (S2) 80 and 82. The spin valve sensor 200 includes a free layer structure 202 and a self-pinned antiparallel (AP) pinned layer structure 204. A nonmagnetic electrically conductive spacer layer (S) 206 is located between the free layer structure 202 and the AP pinned layer structure 204. Because the free layer structure 202 is located between the AP pinned layer structure 204 and the second shield layer 82 the spin valve sensor 200 is a bottom spin valve sensor. A seed layer structure 208 may be located between the first shield layer 80 and the AP pinned layer structure 204. The seed layer structure 208 may include first and second seed layers (SL1) and (SL2) 210 and 212. The seed layers, with the thicknesses and materials shown, have been found to promote a desirable texture of the layers deposited thereon.

Page 9, lines 12-24, delete the entire paragraph.

Page 9, lines 12-24 add the following paragraph:

The free layer structure 202 may include first and second free layers (F1) and (F2) 230 and 232. It has been found that when the free layer structure 202 has a cobalt iron first free layer 230 between the spacer layer 206 and a nickel iron second free layer 232 that the magnetoresistive coefficient dR/R of the spin valve sensor is increased. The free layer structure has a magnetic moment 234 which is oriented parallel to the ABS and parallel to the major thin film planes of the layers. When a signal field from the rotating magnetic disk rotates the magnetic moment 234 into the sensor the magnetic moments 234 and 228 become more antiparallel which increases the resistance of the sensor to the sense current I_S and when a field signal rotates the magnetic moment 234 out of the sensor the magnetic moments 234 and 228 become more parallel which decreases the resistance of the sensor to the sense current I_S. These resistance changes cause potential changes within the processing circuitry 50 in Fig. 3 which are processed as playback signals. A cap layer 242 is located on the free layer structure 202 for protecting it from subsequent processing steps. The above layers form the spin valve sensor 200 with first and second side surfaces 252 and 254.